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The Use of Small Scions and Bare-Root Stock in Grafting White Pine

by

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In Ontario, bench veneer grafting of white pine (Pinus strobus L.) in late winter or early spring is the practice. Scions (10-15 cm long) are made from top parts (last-year's growth) of lateral-terminal branches, and 3+0 seedlings are used as root stock. The stock is potted in the spring prior to grafting and checked for survival in the pot at grafting time. The grafts are maintained in greenhouses for the period of establishment (1-2 months) and then out-planted in the nursery. This grafting procedure is successful, but difficulties arise when the number of scions from a plus tree falls short of the number of grafts needed for a seed orchard. The use of smaller scions would permit a sufficient number of grafts to be made and would avoid delays which may occur when scions from already established grafts have to be taken for further regrafting. Another problem is the expense associated with potting the seedling stock and its subsequent maintenance. The use of bare-root stock would avoid these expenses. Grafting trials with small scions and bare root stock were therefore initiated at the Ontario Tree Improvement and Forest Biomass Institute in 1981 and are described below.

Materials and Methods

Scions of three clones of white pine were taken from trees of 14 to 17 years of age growing in the Maple Arboretum. The scions were of terminals of the second or third order branches collected from the upper part of the crown on April 7, 1981. They were small (2 to 5 cm in length, 2 to 4 mm in diameter) and had the terminal bud with 4 to 5 needle bundles (Fig. 1). They were labelled according to ortets, wrapped in moist paper towels, packed into plastic bags and kept in a refrigerator (at 3-5^{o}C) until grafted.

Regular white pine 3+0 seedling stock was used as root-stock. To provide potted stock (control), seedlings were lifted in spring 1980 and placed in 10 cm diameter green plastic pots filled with an equal mixture of peat and loam. The pots were kept outdoors until March 27, 1981, when they were moved to a cool shaded area in the greenhouse.

To provide bare root stock, 3+0 seedlings were lifted on April 10, 1981, placed in 62 cm diameter x 75 cm deep plastic pails, covered with moist hardwood sawdust and stored with the potted stock.

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The scions were veneer-grafted next to the root collar on both potted and bare root stock, on April 11, 1981. The graft union was about 3 to 4 cm in length. The grafts were tied with rubber-bands and covered by grafting wax (English grafting wax, F.W. Jones and Son Ltd. Bedford, Quebec product). Ten grafts were made for each clone per treatment.

Bare-root grafts were kept loosely bundled in plastic pails as described previously and kept next to the potted stock in the greenhouse. After 5 weeks, the rubber bands and the wax were removed from the graft unions; for clone 5-1646 a new thin layer of wax was applied again over the graft union, while others were not rewaxed (Fig. 2). Both bare root and potted grafts (pots removed) were then planted into a nursery bed with the graft union beneath the soil. The nursery bed was double-shaded (burlap on a wood frame) and the grafts were well watered. The shade was gradually removed as the grafts hardened off. Survival was assessed at the end of the first season.

Results and Discussion

The results (Table 1) indicate that small-size scions can be successfully grafted onto potted stock. Survival on bare root stock, however, was reduced. Nonetheless, results are encouraging and further development of the technique is warranted. For example, rewaxing of clone 5-1646 after removal of the rubber bands may have contributed to the higher survival rate. The use of biodegradable bands may further improve survival.

Table 1. Survival percentage in grafting small scions on bare root and potted stocks. Ten grafts per clone and treatment made.

Clones	Origin	% Survival of grafts on Bare root stock	Potted stock
5-1646	*P. strobus*	90	100
5-1630	*P.* (*griffithii* x *strobus*) x (*griffithii* x *strobus*)	70	100
5-1853	*P.* (*griffithii* x *strobus*) x (*griffithii* x *strobus*)	60	100

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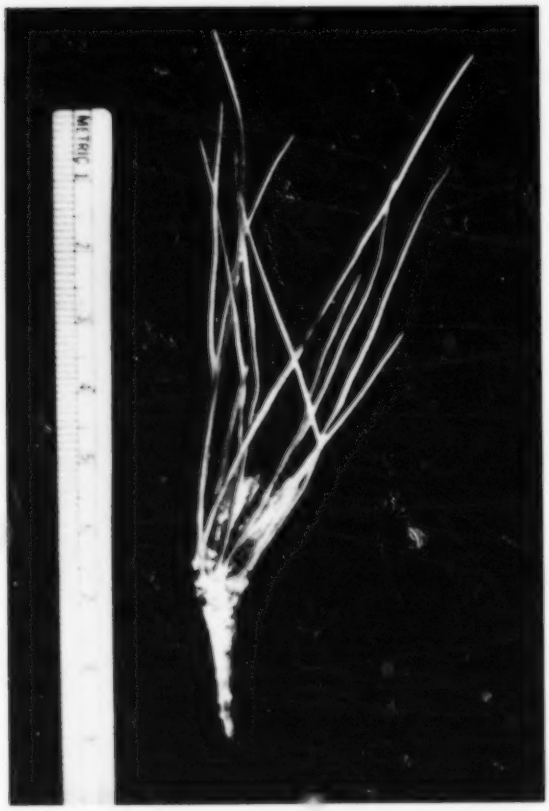

Figure 1. Small P. strobus scions used in trial

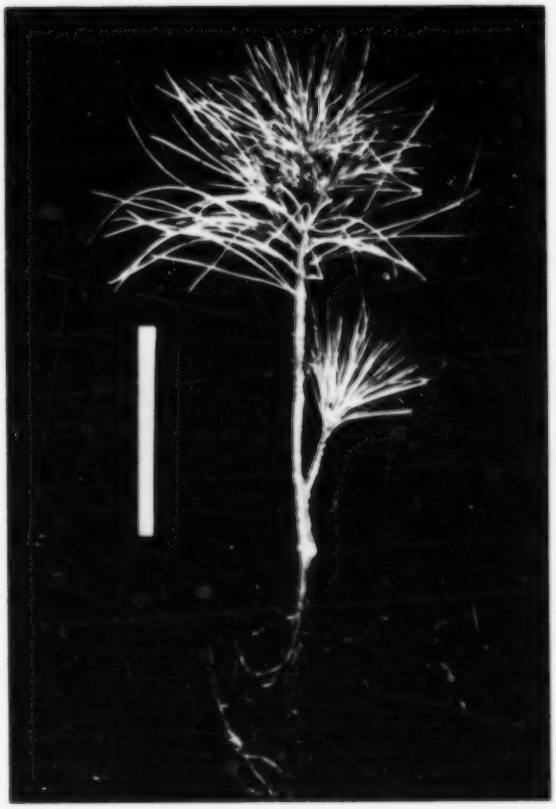

Figure 2. Small scion grafted on 3+0 bare root stock at the time of planting in nursery (5 weeks after grafting)